User Manual

PDC-190S

Trusted ePlatform Services

ADVANTECH

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Declaration of Conformity

CE

This LCD monitor is confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility Directive (93/42/EEC).

FCC Class B

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warning! *Any changes or modifications made to the equipment which are not expressly approved by the relevant standards authority could void your authority to operate the equipment.*

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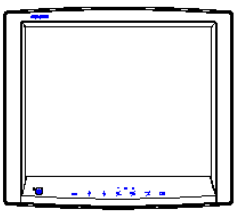
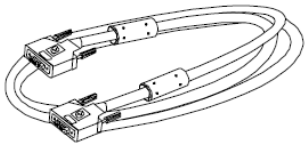
Packing List

Before setting up the system, check that the items listed below are included and in good condition. If any item is missing, please contact your dealer immediately.

- PDC-190S display monitor
- Accessories for PDC-190S
  - AC/DC power adapter (MPU100-105, P/N: 1757000275)
  - DVI-D cable (2 m, P/N: 1700000243)
  - USB cable (1.8 m, P/N: 1700041800) for host to hub
  - Audio cable (1.5 m, P/N: 1700000222)
  - "Drivers and Utilities" CD-ROM disc (User manual inside)
  - Packet of VESA mounting screws



PDC-190S

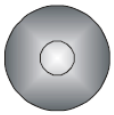


DVI-D Cable

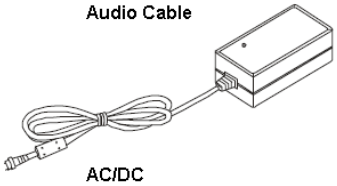
Quick Start Guide

USB Cable

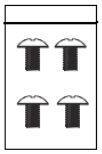
Audio Cable



Driver & Utility Disk



AC/DC
Power Adapter



VESA Mounting screws

Warning! *To prevent electric shock, Do not remove cover.*
No user serviceable parts inside, refer servicing to qualified personnel.

Additional Information and Assistance

1. Visit the Advantech websites at www.advantech.com or www.advantech.com.tw where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages
   - This equipment is a source of electromagnetic waves. Before use please, make sure that there are not EMI sensitive devices in its surrounding which may malfunction therefore.

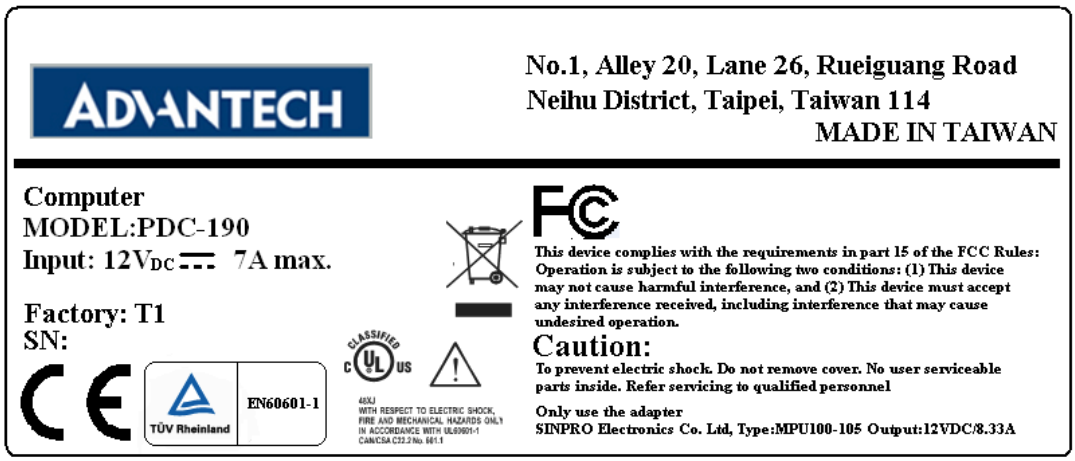
Warning!

1. *Input voltage rated 12 VDC, 7A*
2. *Packing: please carry the unit with both hands, handle with care*
3. *Our European representative:*
   Advantech Europe GmbH
   Kolberger Straße 7
   D-40599 Düsseldorf, Germany
   Tel: 49-211-97477350
   Fax: 49-211-97477300
4. *Maintenance: to properly maintain and clean the surfaces, use only approved products or clean with a dry applicator*

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User's Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
    a. The power cord or plug is damaged.
    b. Liquid has penetrated into the equipment.
    c. The equipment has been exposed to moisture.
    d. The equipment does not work well, or you cannot get it to work according to the user's manual.
    e. The equipment has been dropped and damaged.
    f. The equipment has obvious signs of breakage.
15. DO NOT LEAVE THIS EQUIPMENT IN AN UNCONTROLLED ENVIRONMENT WHERE THE STORAGE TEMPERATURE IS BELOW -20° C (-4° F) OR ABOVE 60° C (140° F). THIS MAY DAMAGE THE EQUIPMENT.
16. IMPROPER INSTALLATION OF VESA MOUNTING CAN RESULT IN SERIOUS PERSONAL INJURY! VESA mount installation should be operated by professional technician, please contact the service technician or your retail if you need this service.
17. CLASSIFICATION:
    - Class I Equipment (For the power adapter)
    - No applied part
    - IPX1
    - Continuous Operation
    - This equipment is not classified as Category AP or APG
18. Disconnect device: Appliance inlet.
19. Follow the national requirement to dispose unit.
20. Maintenance: to properly maintain and clean the surfaces, use only the approved products or clean with a dry applicator.

21. Contact information:
    No.1, Alley 20, Lane 26, Reuiguang Road Neihu District, Taipei, Taiwan 114, R.O.C.
    TEL: (02) 2792-7818


ADVANTECH
No.1, Alley 20, Lane 26, Rueiguang Road
Neihu District, Taipei, Taiwan 114
MADE IN TAIWAN
Computer
MODEL:PDC-190
Input: 12VDC 7A max.
Factory: T1
SN:
TÜV Rheinland
EN60601-1
This device complies with the requirements in part 15 of the FCC Rules: Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.
Caution:
To prevent electric shock. Do not remove cover. No user serviceable parts inside. Refer servicing to qualified personnel
Only use the adapter
SINPRO Electronics Co. Ltd, Type:MPU100-105 Output:12VDC/8.33A

22. This equipment shall not be used for life support system.
23. Accessory equipment connected to the analog and digital interfaces must be in compliance with the respective nationally harmonized IEC standards (i.e. IEC 60950 for data processing equipment, IEC 60065 for video equipment, IEC 61010-1 for laboratory equipment, and IEC 60601-1 for medical equipment.) Furthermore all configurations shall comply with the system standard IEC 60601-1-1. Everybody who connects additional equipment to the signal input part or signal output part configures a medical system, and is therefore, responsible that the system complies with the requirements of the system standard IEC 60601-1-1. The unit is for exclusive interconnection with IEC 60601-1 certified equipment in the patient environment and IEC 60XXX certified equipment outside of the patient environment. If in doubt, consult the technical services department or your local representative.
24. The user should not connect SIP/SOPs and the patient at the same time.
25. The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70dB (A).

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

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Chapter 1

General Information

1.1 Introduction

The PDC-190S LCD monitor is designed specifically for medical environments. The monitors comply with key safety requirements and are ideal for use in endoscopy, surgery, patient monitoring, radiology and more. Slim and light, they can be used in many installations - fixed to a wall or ceiling, mounted on a standard arm or installed on the optional stand. The front side of the PDC-190S is IP65 certified dust and water resistant to ensure reliability in medical environments.

The display can be placed on a desktop replacing traditional desktop and medical monitors. In addition, its factory presetting of "DICOM GSDF" LUT lets PDC-190S be used in reviewing of X-Ray/CT pictures.

1.2 Specifications

Display	Display type	19" diagonal screen size TFT LCD
	Max. Resolution	1280 x 1024
	Max. Colors	16.7M
	Dot size (mm)	0.294 x 0.294
	Viewing angle	170/170°
	Luminance	600 cd/m^2 (DICOM preset at 400 cd/m2, w/ stabilization System)
	Contrast ratio	1000: 1
	LCD MTBF	50,000 hours
	Backlight lifetime	50,000 hours
I/O Ports	Video input port	Composite: BNC x1, S-Video: mini DIN-4 x1, YPbPr/RGB: BNC x3, Ext SYNC: BNC x1, HD/SD-SDI: BNC x1, DVI: DVI-I x1, VGA*: Through DVI-I to HD15 adapter
	Video output port (Loop through)	Composite: BNC x 1, S-Video: mini DIN-4 x1, HD/SD-SDI: BNC x1
	Audio/ USB hub/ Power	Line-in: phone jack x1, USB downstream: type A x2, USB upstream: type B x1, DC power connector: DIN-4 x1
Speakers		1 W speakers x 2
Power Supply	Model	Universal AC/DC adapter (SINPRO model no. MPU100-105)
	Input voltage	100 ~ 240 VAC, 47 ~ 63 Hz,
	Output voltage	+12 VDC, 8A max. (100 watts)
Optional Touch Screen	Type	Analog Resistive
	Resolution	Continuous
	Light transmission	75%
	Controller	USB interface
	Durability	30 million touches

Environment	Temperature	0 ~ 40 (Operating)
	Humidity	10 ~ 95%@40 (non-condensing)
	Vibration / Shock Resistance	5 ~ 500 Hz, 1G acceleration / 20 G half sine, 11 msec duration
	Water/dust Resistance	IPX1 for whole system
Physical Characteristics	Dimensions (W x H x D)	471.5 x 416.2 x 110.8 mm (18.56” x 16.38” x 4.36”)
	Weight	6.5 kg (14.32 lb)

Approvals and Conformity

EMC:

For Europe

This device is hereby confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility Directive (89/336/EEC; amended by 92/31/EEC, 93/68/EEC & 98/13/EC). For evaluation regarding Electromagnetic Compatibility (89/336/EEC; amended by 92/31/EEC, 93/68/EEC & 98/13/EC), the following standards are applied:

- IEC 60601-1-2: 2001 + A1: 2004;
- EN 55011: 1998 + A1: 1999 + A2: 2002
  IEC 61000-4-2: 1995 + A1: 1998 + A2: 2000;
  IEC 61000-4-3: 2006;
  IEC 61000-4-4: 2004;
  IEC 61000-4-5: 2005;
  IEC 61000-4-6: 2006;
  IEC 61000-4-8: 1993 + A1:2000;
  IEC 61000-4-11:2004;
- EN 61000-3-2: 2000 + A2: 2005
- EN 61000-3-3: 1995 + A1: 2001

For US

- FCC 47 CFR Part15, Subpart B, Class B
- CISPR 22:1997+A1: 2000
- ICES-003: 2004

Safety:

For Europe

EN60601-1 TUV

For US

UL60601-1

For China

CCC

1.3 Connectors

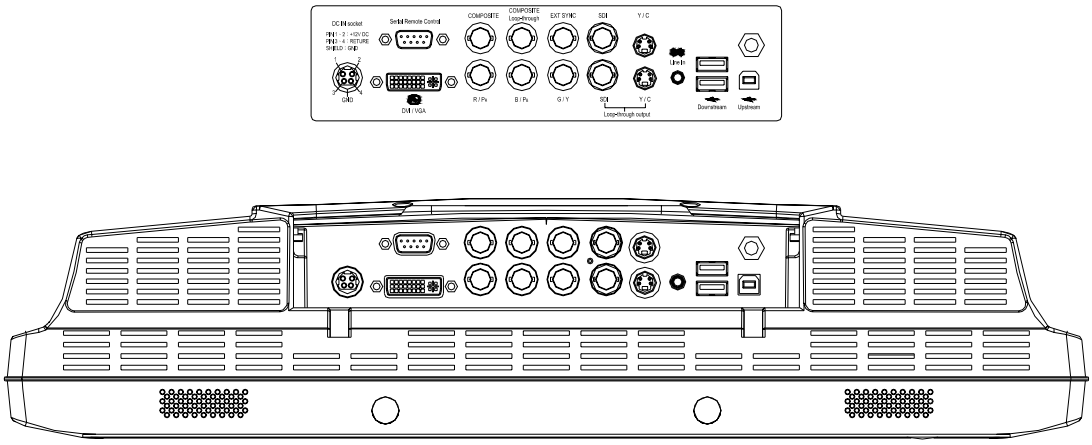


Figure 1.1 PDC-190S connection port

The following connectors are situated on the rear of the PDC-190S (From left to right):

1.3.1 DC 12V Power In

The connector is connected to the DC 12V Switching Power Supply.

1.3.2 Analog and Digital Port (DVI-I)

The DVI-I connector integrates the analog RGB and digital DVI in one port, that can be selected via "source" OSD button to switch which signal you want to input into the monitor. Use of the scan converter allows the monitor to detect VGA, SVGA, XGA and SXGA signal input. The details of compatible timings are listed in Appendix B of this manual.

Table 1.1: Description of the DVI-I Port

Pin No.	Function Description
1	T.M.D.S. Data2-
2	T.M.D.S. Data2+
3	T.M.D.S. Data2/4 Shield
4	T.M.D.S. Data4-
5	T.M.D.S. Data4+
6	DDC Clock
7	DDC Data
8	Analog Vertical Sync
9	T.M.D.S. Data1-
10	T.M.D.S. Data1+
11	T.M.D.S. Data1/3 Shield
12	T.M.D.S. Data3-
13	T.M.D.S. Data3+
14	+5V Power
15	Ground (for +5 V)
16	Hot Plug detect

17	T.M.D.S. Data0-
18	T.M.D.S. Data0+
19	T.M.D.S. Data0/5 Shield
20	T.M.D.S. Data5-
21	T.M.D.S. Data5+
22	T.M.D.S Clock Shield
23	T.M.D.S Clock +
24	T.M.D.S Clock −
C1	Analog Red
C2	Analog Green
C3	Analog Blue
C4	Analog Horizontal Sync
C5	Analog Ground (Return of analog R,G,B)

1.3.3 Serial Remote RS-232C Port (DB-9, female)

Connects the RS-232C control connector on external equipment to the monitor. The monitor can be operated according to control commands sent from external equipment connected to it. For details of the pin assignment and factory setting function, see Appendix D.

1.3.4 YPrPb/RGBS Port (BNC)

PDC-190S supports component signal for RGB/YPrPb color difference. From left to right they are R/Pr, B/Pb, G/Y and external sync signal for RGB signal.

1.3.5 CVBS In/Out Port (BNC)

PDC-190S supports a composite video port. PDC-190S also supports Loop-through output of the composite signal input to the input connectors.

1.3.6 Y/C In/Out Port (4-pin mini-DIN)

PDC-190S supports a Y/C signal port. PDC-190S also supports Loop-through output of the Y/C signal input to the input connectors.

1.3.7 SDI In/Out Port (BNC)

PDC-190S supports an SDI signal port. PDC-190S also supports Loop-through output of the SDI signal input to the input connectors. The terminals accept the following signals.

- SMPTE292M HD SDI signal
- SMPTE259M SD SDI signal

The signal is output from the Loop-through terminal only when the monitor is ON.

1.3.8 Audio Port (Audio Jack)

PDC-190S supports one audio line-in port, and the audio volume can be adjusted via OSD.

1.3.9 USB Type B Port and USB Type A Port

There is one USB 2.0 input that can accept signals from an external standard PC via the type B connector of PDC-190S. The PDC-190S provides two USB 2.0 hub functions via a type A connector.

1.3.10 Equipotential Terminal

Connects the equipotential plug in the European Market.

1.4 Dimensions

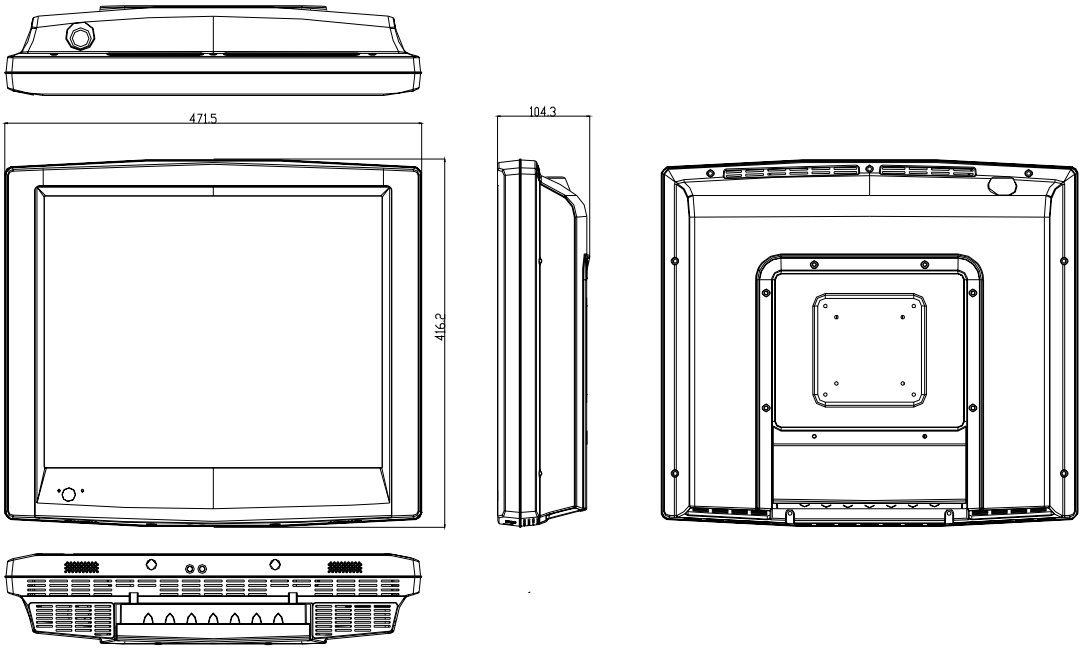


Figure 1.2 Dimensions of the PDC-190S

Chapter 2

System Setup

2.1 Location and Function of Parts and Controls

Before you start to set up the PDC-190S, take a moment to become familiar with the locations and purposes of the controls, drives, connectors and ports, which are illustrated in the figures below. When you place the PDC-190S upright on the desktop, its front panel appears as shown in Figure 2.1.

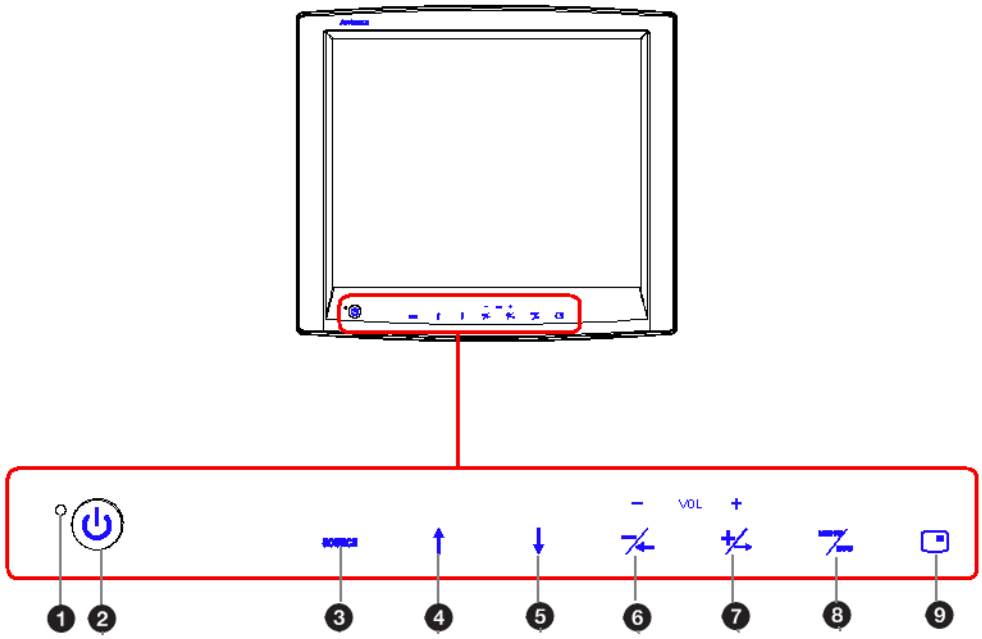


Figure 2.1 Front Panel of PDC-190S

Table 2.1: Control Buttons of PDC-190S

No	Control	Function
1	Power Indicator	Power Status When the power is turned on for the first time and video signal is detected, the LED light is green. When no signal is detected, the LED is blinking red. When the power is turned off, the LED is dark.
2	Power Button	Power control Press to power on/off the LCD monitor.
3	Source	Input select buttons Press the button to monitor the signal input to each connector.
4	MENU Up	Press to select items Scroll up through the adjustment items.
5	MENU Down	Press to select items Scroll down through the adjustment items.
6	Decrement *Volume down (Available when OSD not active)	Press to select the setting values Decreases value of the adjustment items. (*Decreases speaker volume when OSD not active)
7	Increment *Volume up (Available when OSD not active)	Press to select the setting values Increases value of the adjustment items. (*Increase speaker volume when OSD not active)

8	Menu/Escape	Displays or sets the on-screen menu Press to display the on-screen menu. Press again to clean the menu and will save the value of adjustment items.
9	Multi-display On/Off	Multiple display Enable/Display Press to enable/disable multiple display.

PDC-190S is equipped with an on-screen menu for making various adjustments and settings such as picture control, input setting, set setting change, etc. You can also change the menu language display in the on-screen menu.

The OSD control switch is located on the front bezel. For detailed information please refer to Appendix-A “OSD Selections”.

When you turn the PDC-190S around and look at its rear cover, you will find the sunken I/O section is at the bottom of the PDC-190S, as shown in Fig. 2-2. (The I/O section includes various I/O ports, including the DVI-I, Component Video, S-Video, USB ports, and the line-in jack.

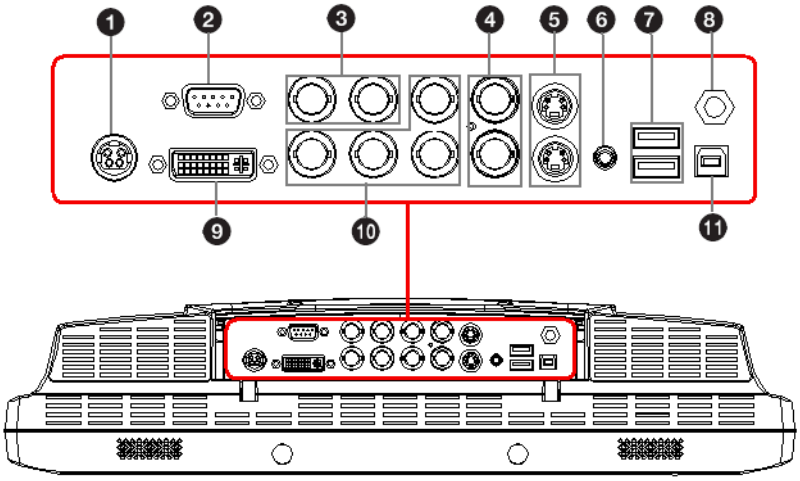


Figure 2.2 I/O Section of PDC-190S

Table 2.2: I/O Connectors of PDC-190S

No	I/O	Function
1	DC 12V IN connector (DIN 4 pins)	Connect the DC connect of the supplied AC adapter.
2	Serial Remote RS-232C connector (D-Sub 9)_	Connect to the RS-232C control connector on external equipment connected to the monitor.
3	Composite IN connector (BNC, left) Composite Out connector (BNC, right)	Input connector for composite signals. Loop-through output of the composite IN connector
4	HD/SD SDI IN connector (BNC, top) HD/SD SDI Out connector (BNC, bottom)	Input connector for HD/SD SDI signals. Loop-through output of the HD/SD SDI IN connector
5	Y/C IN connector (4-pin mini DIN, top) Y/C Out connector (4-pin mini DIN, bottom)	Input connector for Y/C signals. Loop-through output of the Y/C IN connector

❻	PC Line IN/Audio Line IN connector (2.5 mm phone jack)	Input connector for audio signals.
❼	USB Hub Port (type A)	USB downstream port (to peripheral USB devices).
❽	Equipotential terminal	Connects the equipotential plug (As below picture).
❾	DVI-I input connector	Inputs DVI Rev.1.0 applicable digital RGB signal. Or inputs an analog RGB video signal (0.7 Vp-p, positive polarity) and sync signal.
❿	YPbPr/RGBS input connector	Input connector for component video signals / RGB signals.
⓫	USB Port (type B)	USB upstream port (to PC host devices).

2.2 Preparing for First-time Use

No tools are required to set up the LCD monitor. Simply follow the instructions outlined in the next few sections. Connectors for the signal cables and power are located on the back of the panel behind the cover door.

Caution! *To select the signal input for each connector manually, press the source button on the monitor.*

2.3 Installation Procedures

2.3.1 Connect DVI Cable

Connect the DVI-D cable to the DVI-I connector of the monitor. If the cable does not seem to fit, it may be facing the wrong direction. Please turn the cable over and try it.

Caution! *When the DVI-D signal is active, analog VGA input is not available.*

2.3.2 Connect VGA Cable

Connect the DVI-I to VGA cable to the DVI-I connector of the monitor. If the cable does not seem to fit it may be facing the wrong direction. Turn the cable over and try to match the shape of the connector with that of the graphics adapter.

Caution! *When the VGA signal is active, digital DVD input is not available.*

2.3.3 Connect Composite Cable

Connect the BNC (75 ohms) cable to the Composite IN connector of the monitor. If you have a loop-through requirement, please prepare another BNC cable for connection to the Composite OUT connector on the right side of the Composite IN connector.

The IN connector is terminated internally at 75 ohms when nothing has been connected to the output connector. If a cable is connected to the output connector, the internal terminal is automatically released and the signal input to the input connector are output to the output connector (loop-through).

2.3.4 Connect Y/C Signal Cable

Connect the S-Video cable to the Y/C IN connector of the monitor. If you have a loop-through requirement, please prepare another S-Video cable for connection to Y/C OUT connector on the right side of Composite IN connector.

The IN connector is terminated internally at 75 ohms when nothing has been connected to the output connector. If a cable is connected to the output connector, the internal terminal is automatically released and the signal input to the input connector are output to the output connector (loop-through).

2.3.5 Connect Component/RGB Signal Cable

Connect the 3 x BNC (75 ohms) cables to the YPrPb IN connector of the monitor.

Or connect the 4 x BNC (75 ohms) cables to the RGBS IN connector of the monitor.

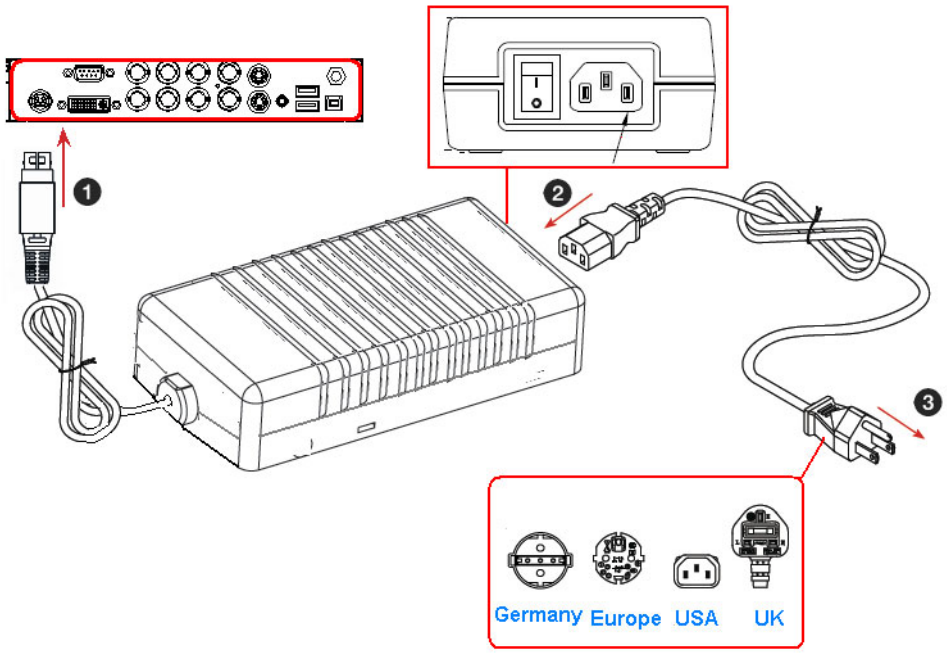
2.3.6 Connect SDI Signal Cable

Connect the BNC (75 ohms) cable to the SDI IN connector of the monitor. If you have a loop-through requirement, please prepare another BNC (75 ohms) cable for connection to the SDI OUT connector on the bottom of the SDI IN connector.

The IN connector is terminated internally at 75 ohms when nothing has been connected to the output connector. If a cable is connected to the output connector, the internal terminal is automatically released and the signal input to the input connector is sent to the output.

2.3.7 Connect AC Power Cord

1. Insert the DC IN connector (DIN plug, type B) into the DC 12V IN connector on the bottom of the monitor until it locks.



2. Plug the AC power cord (IEC-320, C13) into the AC IN socket (IEC-320, C14) on the AC adapter.

Caution! *An AC power cord is not included in the accessories list, please contact local Advantech service if you need to purchase a local AC power cord.*

3. Plug the AC power cord into AC outlet, then switch-on the power switch on the side of AC adapter. The LED indicator turns green!

Caution! *When you disconnect the cord/cables, be sure to hold the connector and not the cable itself.*

Appendix A

OSD Selections

A.1 Introduction

When you place the PDC-190S upright on the desktop (Landscape display), you will see eight keys located on the bottom of front panel. Their function is described in the table below:

Icon	Control	Function
	Power Button	Power control Press the On/Off button to power the LCD monitor.
SOURCE	Source	Input select buttons Press the button to monitor the signal input to each connector.
	MENU Up	Press to select items Scroll up the list of adjustment items.
	MENU Down	Press to select items Scroll down the list of adjustment items.
	Decrement *Volume down (Available when OSD is not active)	Press to select the setting values Decreases value adjusting down. (*Decrease speaker volume when OSD is not active)
	Increment *Volume up (Available when OSD is not active)	Press to select the setting values Increases value adjusting up. (*Increase speaker volume when OSD is not active)
	Menu/Escape	Displays or sets the on-screen menu Press to display the on-screen menu. Press again to clean the menu and will save the value of adjustment items.
	Multi-display On/Off	Multiple display Enable/Display Press to enable/disable multiple display.

The OSD menu is activated by pressing the “MENU/ESC” key on the front bezel. You can select and adjust the function of your choice by using other four keys (↑ ↓ ←→) together. The main menu displays a list of submenu icons and the current video input mode.

Press the key (↑ ↓) to move the highlights to the control you would like to adjust, then press the key (→) inward to select that control or to activate that function. Depending on the control you selected, a submenu of the control with a status bar will appear. The status bar indicates in which direction, from the factory preset, your adjustments are being made.

When you have finished making the adjustments, the setting is saved automatically by pressing the key MENU/ESC to exit the control function. If you do not touch any key for 20 seconds, OSD is automatically exited saving your current settings.

Table A.1: Description of the OSD Directory

Level 1	Level 2	Level 3	Level 4	Value	Description
Image					While detect of VGA/DVI signal
	Brightness			0-100	Controls analog amplitude on input ADC
	Contrast			0-100	Controls analog black level on input ADC
	Hue(*) (*active in Video Input)			0-100	
	Satura-tion(*) (*active in Video Input)			0-100	
	Sharpness			0-100	Adjusts image position for cen-tered image
	Color				
		Auto Color(*) (*active in VGA mode)			Auto adjust color temperature
		Color Temp.		0 User 2.2 1 4300K Endoscope 2 6500K 2.2 3 6500K DICOM 4 9300K 2.2	Adjust the color temperature & Gamma
		User Color* (*active in User mode)	Red	0-100	Adjust the red color of the dis-play
			Green	0-100	Adjust the green color of the dis-play
			Blue	0-100	Adjust the blue color of the dis-play
Display					
	Auto Con-figuration(*) (*active in VGA mode)				Auto adjust to optimum image
	Phase(*)			0-100	Adjust the synchronized tim-ings of image
	Clock(*)			0-100	Adjusts image position for cen-tered image
	Display Control	Display Image		0- Auto 1- Aspect 2- 1:1	

		Aspect Ratio* (*active in Aspect mode)	0- Auto 1- 4:3 2- 16:9	
		Display Position (*active in VGA mode)		
PIP Function				
	PIP		0- ON 1- OFF	Default is OFF
	PIP Input			
	PIP Size		0- Large 1- Medium 2- Small 3- Side	
	PIP Position			
	PIP Color	Brightness adjust	0-100	Controls analog black level on input ADC
		Contrast adjust	0-100	Controls analog amplitude on input ADC
		Hue(*) (*active in PIP Video Input)	0-100	
		Satura-tion(*) (*active in PIP Video Input)	0-100	
	Blend		0-15	
Sound				
	Volume		0-20	
	Mute		ON/OFF	
System				While detect of Video signal
	Input Select		DVI D-SUB(VGA) S-Video Composite Component RGBS SDI (HD-SDI)	
	Language		English French German Traditional Chinese Simplified Chinese Japanese Dutch	Choose the lan-guage of OSD you need

	OSD Duration	0- 5 sec. 1- 10 sec. 2- 15 sec. 3- 20 sec. 4- 25 sec. 5- 30 sec. 6- 35 sec.	Adjust the time period for OSD menu disappear (Unit: second)
	OSD Position		Adjusts position of OSD
	Factory Reset		Load Default

A.2 Main Menu Descriptions

The LCD monitor is capable of accepting both digital and analog signal inputs and therefore has two different sets of OSD control functions. Since digital signaling always gives optimal display quality without much adjustment, it requires fewer OSD functions than the analog input mode. Those functions that are not available in the digital input mode, e.g.: Auto Setup, Display, Clock/phase, etc., are denoted by an asterisk **(*)/(**)** in the following descriptions. If selected while in digital input mode, they will not be available.

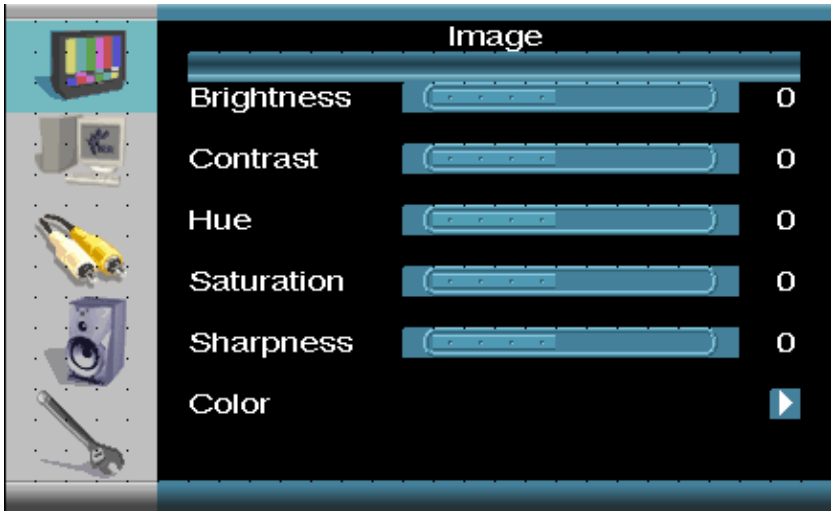


Figure A.1 Item Main Menu in OSD display

A.3 Brightness Descriptions*

Selecting this control allows you to make adjustments to the luminosity level of the display screen on a scale of 0 to 100.

Use the key on the front bezel to adjust the Brightness at any time the OSD is on.

Note! *This setting is only available on D-sub & video input, S-Video, composite, component/RGBS, SDI.*

A.4 Contrast Descriptions*

Selecting this control allows you to make adjustments to the contrast level of the display screen on a scale of 0 to 100.

Use the key on the front bezel to adjust the contrast any time the OSD is on.

Note! *This setting is only available on D-sub & video input, S-Video, composite, component/RGBS, SDI.*

A.5 Hue Descriptions**

Selecting this control allows you to make adjustments to the color tones of the display screen on a scale of 0 to 100. The higher the setting, the more greenish the picture.

Use the key on the front bezel to adjust the contrast any time the OSD is on.

Note! *This setting is only available on video input, S-Video, composite, component/RGBS, SDI.*

A.6 Saturation Descriptions**

Selecting this control allows you to make adjustments to the color intensity of the display screen on a scale of 0 to 100. The lower the setting, the lower the intensity.

Use the key on the front bezel to adjust the contrast any time the OSD is on.

Note! *This setting is only available on video input, S-Video, composite, component/RGBS, SDI.*

A.7 Sharpness Descriptions**

Selecting this control allows you to make adjustments to the sharpness level of the display screen on a scale of 0 to 100. The higher the setting, the sharper the picture; the lower the setting, the softer the picture.

Use the key on the front bezel to adjust the contrast any time the OSD is on.

Note! *This setting is only available on video input, S-Video, composite, component/RGBS, SDI.*

A.8 Color Descriptions*

Selecting this control allows you to make adjustments to the Gamma and color temperature level of the display screen.

Use the key on the front bezel to adjust the contrast any time the OSD is on.

Note! *This setting is only available on D-sub & video input, S-Video, composite, component/RGBS, SDI.*

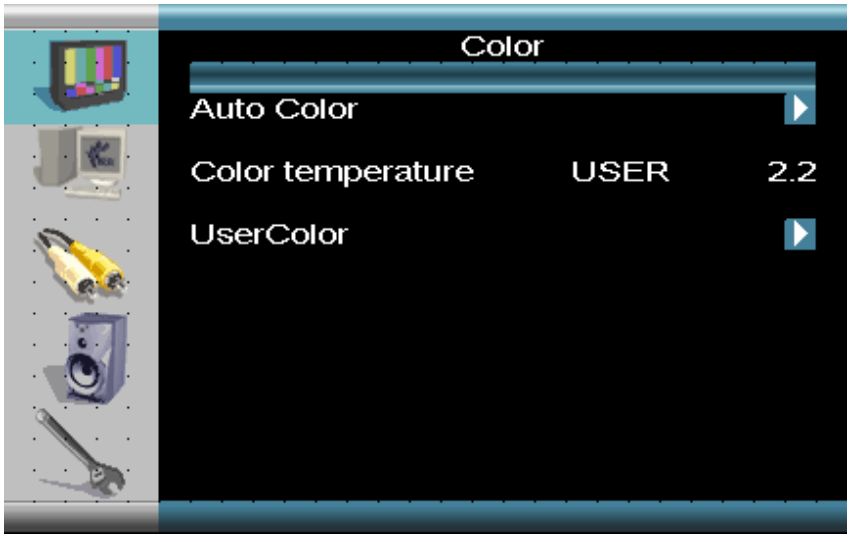


Figure A.2 Item Color in OSD display

A.8.1 Auto Color*

Selecting this control allows you to adjust the color intensity, and color tones of input signal automatically.

A.8.2 Color Temperature*

Selecting this control allows you to select the appropriate gamma/color temperature mode based on your requirements. Four modes are listed as below:

Mode	Function
6500K 2.2	**Color Temp:** 6500K **Gamma:** 2.2
6500K DICOM	**Color Temp:** 6500K **Gamma:** DICOM Preset
4300K Endoscope	**Color Temp:** 4300K **Gamma:** Endoscope Gamma
9300K 2.2	**Color Temp:** 9300K **Gamma:** 2.2
User 2.2	**Color Temp:** Customer config **Gamma:** 2.2

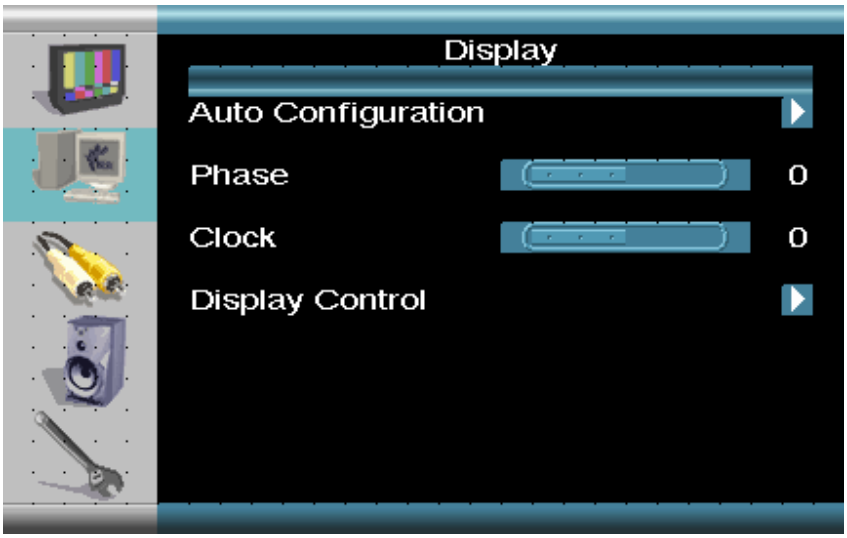
A.8.3 User*

If you set the Color Temp to a value of User 2.2, the item displayed is changed from dark to light white, which means that you can adjust the color temperature. This control allows you to adjust the color gain for each channel of RGB.

A.9 Auto Configuration*

Selecting this control allows you to adjust to monitor the picture more clearly automatically.

Note! *This setting is only available on D-sub (VGA).*



A.10 Phase*

Selecting this control allows you to adjust the frequency / sampling rate of horizontal pixels, to equal the video source's value, thus minimizing the screen artifacts of shimmering vertical lines.

Note! *This setting is only available on D-sub (VGA).*

A.11 Clock*

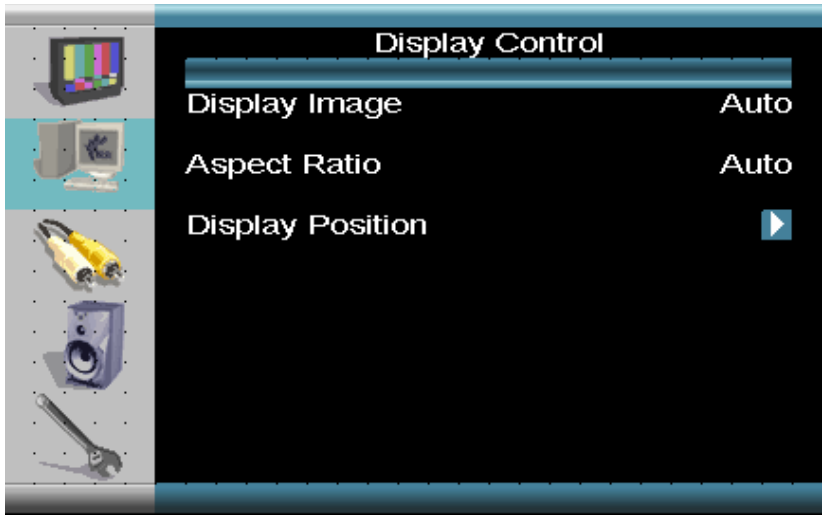
Selecting this control allows you to adjust the ADC (analog/ digital conversion) sampling clock phase so that the screen image appears crisp and focused. Normally, Auto Tune is sufficient to complete this task in automatically without user intervention; the Phase control allows you to adjust it manually in more precise manner.

The Phase and Clock adjustments allow you to more closely adjust your monitor to your preference. If satisfactory results are not obtained using the Phase adjustment, use the Clock adjustment and then use Phase again.

Note! *This setting is only available on D-sub (VGA).*

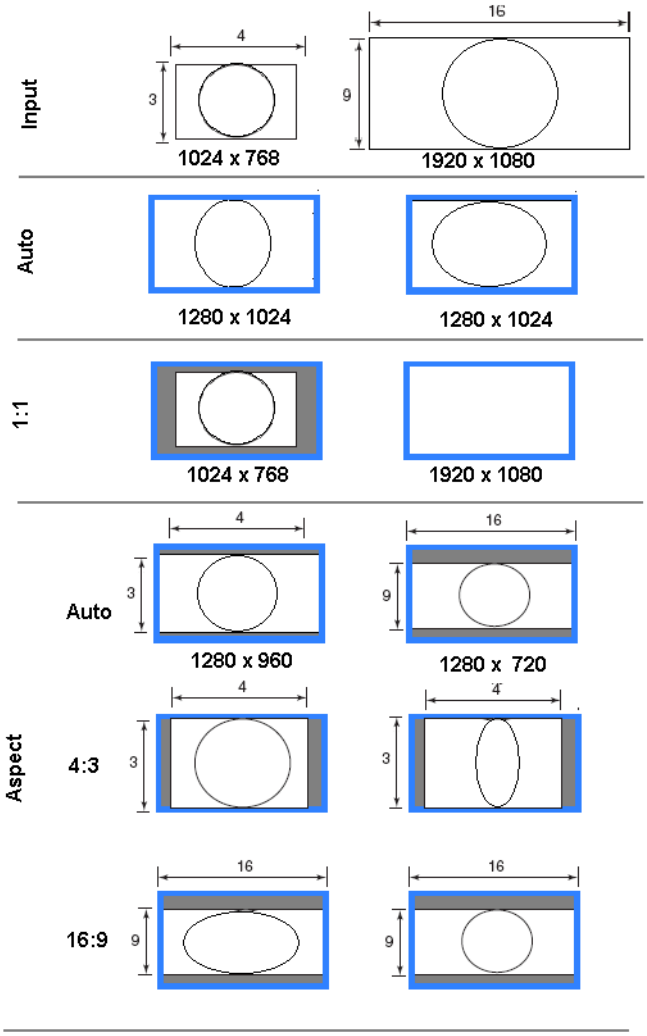
A.12 Display Control

Selecting this control allows you to adjust the horizontal and vertical size of the image.



A.12.1 Display Image

Mode	Function
Auto	Select this control to fill the image on the full screen automatically, and discard the aspect ratio of the original input video signal.
Aspect	Select this control to change the aspect ratio of the picture from 4:3 to 16:9 or 16:9 to 4:3.
1:1	Select this control to display the picture in the original resolution of the input signal. This function does not work when the input video signal has higher resolution than the resolution of the panel



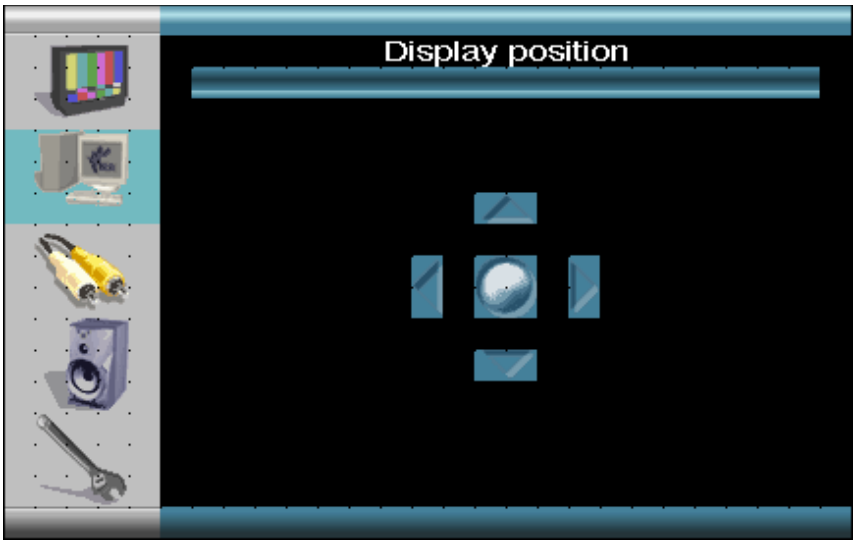
A.12.2 Aspect Ratio*

Note! *This function works only when displaying the picture in the Aspect mode, and does not work when displaying the picture in the Auto/1:1 mode.*

Mode	Function
Auto	Select this control to obtain an optimum image accord to the aspect ratio of the input video.
4:3	Use this function when a 16:9 aspect ratio picture is squeezed into a 4:3 format signal.
16:9	Use this function when a 4:3 aspect ratio picture is zoomed out to a 16:9 format signal.

A.12.3 Display Position

Select this control and then use four keys(↑ ↓ ←→) to adjust the horizontal position and vertical position of the image.



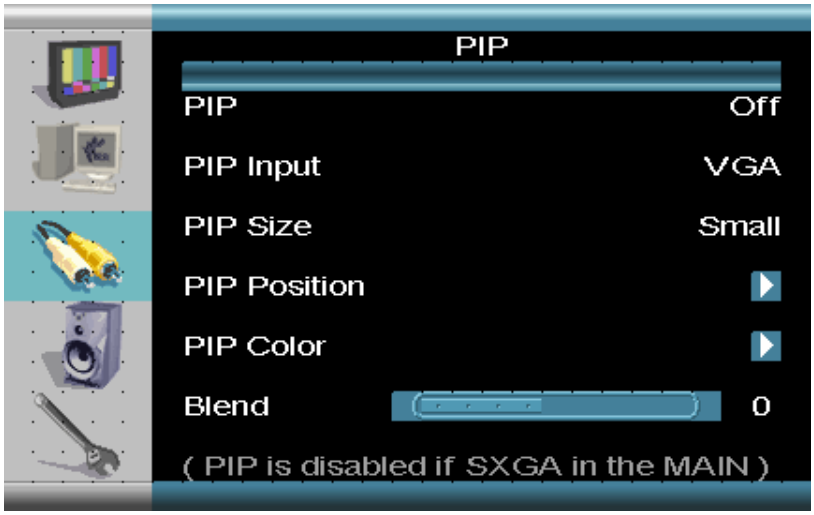
A.13 PIP (Enable/Disable)

Select this control to adjust multi display settings. Selects ON to display the multi display and OFF not to display.

Note! *This function works only when main display resolution is smaller than 1280 x 1024, 70 Hz.*

When the frame frequency of the main display is different from that of the sub display, the picture may be disturbed.

When no signal is input to the main display, the picture may not be displayed correctly.



A.14 PIP Input (Sub Input Select)

Select this control to set the input signal of the sub display. Select from among the items listed below:

- DVI vs. Composite/S-Video/SDI.
- VGA vs. Composite/S-Video/SDI.
- Component vs. Composite/S-Video/SDI.
- RGBS vs. Composite/S-Video/SDI.

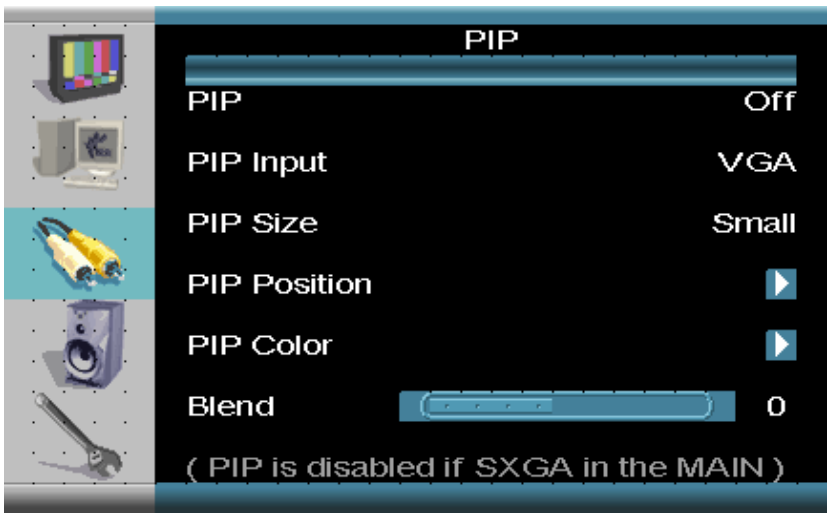
A.15 PIP Size

Sets the size of the sub display. Select from the modes listed below:

Mode	Function
Small	The sub display shrinks to a small size screen and overlaps the main display.
Medium	The sub display shrinks to a medium size screen and overlaps the main display.
Large	The sub display shrinks to a larger size screen and overlaps the main display.
Side By Side	The main display is placed on the left side of the display and the sub display is placed on the right side of the display.

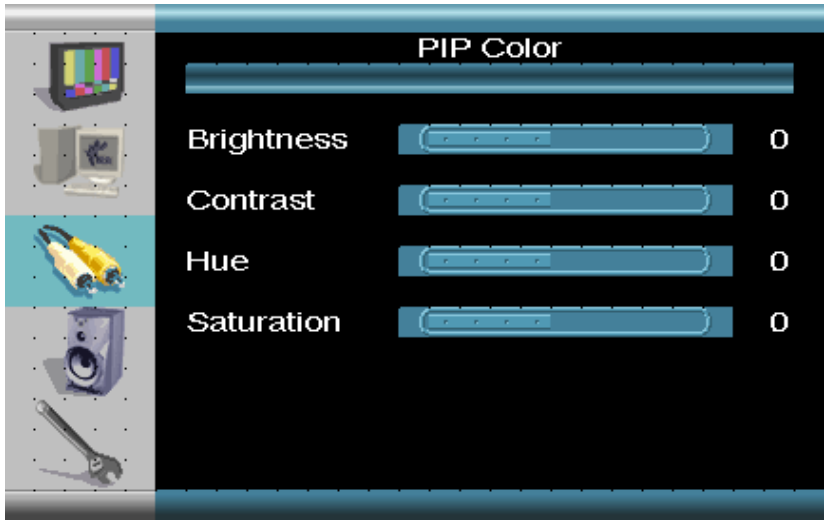
A.16 PIP Position

Select this control and then use four keys (↑ ↓ ←→) to adjust the horizontal position and vertical position of the sub display while PIP size is not on the side by side mode.



A.17 PIP Color

Selecting this control allows you to control the brightness/contrast/hue/saturation of the sub display.



A.18 Blend

Select this control, then use the key to adjust the blending level of sub display.

A.19 Volume

Selecting this control allows you to adjust the volume of the two inside speakers if you have audio signal input from the line in port.

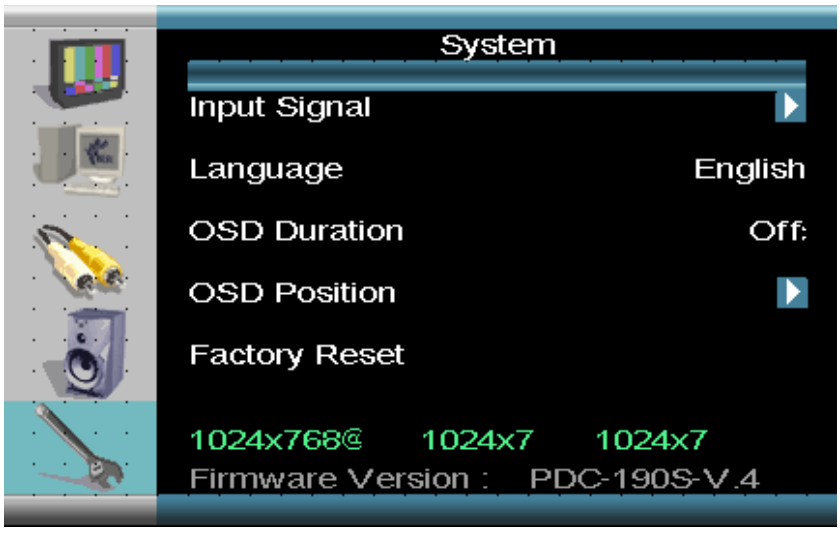
A.20 Mute

Selecting this control allows you to mute the volume of the two inside speakers.

A.21 Input Signal (Main Input Select)

Select this control to set the input signal of the main display. You can select from among

- DVI
- VGA
- Component
- RGBS
- Video (Composite)
- Svideo (S-Video)
- SDI



When you switch the input signal, the Green color OSD will appear on the left-top corner of display to indicate which input signal you select. ex. VGA

A.22 Language

Select this control, to select the OSD Language you want.

A.23 OSD Display Descriptions

Selecting this submenu allows you to adjust various settings of the OSD to make the display adjustment process an easier task.

- OSD Duration: Selecting this control allows you adjust the time period for OSD menu disappear (Unit: second).
- OSD Position: Selecting this control allows you to move the OSD menu verti-cally/Horizontally on the screen.

A.24 Factory Reset

Selecting this control restores all of the OSD control adjustments to the factory default settings.

Appendix B

Timing of Input Signal

B.1 Compatibility of VESA Timing

The LCD monitor is capable of accepting both the traditional analog RGB video signaling and the new digital DVI (Digital Visual Interface) signaling.

Due to its digital design and the implementation of this new digital standard interface, setting frequency mode is not necessary for a user and it will be handled automatically between the monitor and the digital graphic card adapter. For analog input, the LCD monitor operates at horizontal frequencies between 35.1 kHz and 80 kHz, vertical frequencies between 56 Hz and 75 Hz. Because of its microprocessor-based design, it offers auto-synchronization and auto-sizing capabilities.

This monitor offers 21 pre-programmed VESA monitor timing that are listed in the following Table B.1. These preset modes cover most of the common video modes supported by popular graphics adapters. However, each adapter's implementation of these video modes may vary slightly in timings.

Table B.1: Acceptable Frequency and Resolution of VGA/DVI Input Signal

Mode Name	Resolution		Frequency	
	H	V	H(kHz)	V(Hz)
VESA	640	480	37.9	72
	640	480	37.5	75
	800	600	35.1	56
	800	600	37.9	60
	800	600	48.1	72
	800	600	46.9	75
	800	600	53.7	85
	1024	768	48.4	60
	1024	768	56.5	70
	1024	768	60.0	75
	1024	768	68.7	85
	1152	864	53.8	60
	1152	864	67.5	75
	1280	768	47.8	60
	1280	960	59.7	60
	1280	960	85.8	85
	1280	1024	64.0	60
	1280	1024	80.0	75
	1600	1200	75.0	60

B.2 Compatibility of Video Timing

The LCD monitor can display NTSC and PAL signals by connecting this unit. The NTSC or PAL color system or DTV format such as 720p, 1080i, etc. can be selected automatically. For acceptable formats, please refer to Table B.2 “Acceptable Timing of Composite/S-Video Input Signal”.

Acceptable Timing of Composite/S-Video Input Signal

Format (Resolution/V)	CVBS	S-Video	Format Relevant Standard
710x482 /60	V	V	NTSC-M
710x482 /60	V		NTSC-J
710x482 /60	V	V	NTSC-443
702x574 /50	V		PAL-BDGHI
713x482 /59.8	V	V	PAL-M
713x482 /60	V	V	PAL-60
719x574 /50	V	V	PAL-N
702x574 /50	V	V	SECAM

Table B.2: Acceptable Timing of SDTV/HDTV Input Signal

Format	YPrPb / RGBS	SD-SDI	HD-SDI	Format Relevant Standard
480i/60	V	V		SMPTE 253M
480p/60	V			SMPTE 293M
576i/50	V	V		
576p/50	V			ITU-R Rec. BT.1358
720p/50	V			SMPTE 296M
720p/59	V			
720p/60	V	V		SMPTE 296M, ITU-R Rec. BT.1543
1035i/60			V	SMPTE 260
1080i/50	V		V	SMPTE 274, SMPTE 295
1080i/60	V		V	SMPTE 274
1080p/24			V	SMPTE 274
1080p/25			V	SMPTE 274
1080p/30			V	SMPTE 274
1080p/59	V			
1080p/60	V			SMPTE 274, ITU 709

Appendix C

Cleaning/Disinfecting

C.1 On Cleaning the Monitor

During normal use of the PDC the device may become dirty and should be regularly cleaned.

The protection plate surface is especially treated to reduced reflection of light. When solvents such as benzene or thinner, acid, alkaline or chemical cleaning cloth is used for the protection plate surface, the performance of the monitor may be impaired or the finish of the surface may be damaged. Take care with respect to the following steps and suggested cleaning agents listed in the table C.1:

Steps:

1. Prepare cleaning agent per manufacturer's instructions or hospital protocol.
2. Wipe the POC with a clean cloth that has been moistened in the cleaning solution.
3. Wipe thoroughly with a clean cloth.

Table C.1: Cleaning Agent list: Chemical Disinfectants which Have Been Tested on the PDC-190S

No	Cleaning Agents
1	Cidex
2	Isopropyl alcohol
3	Green tinctured soap
4	Windex
5	Alcohol
6	Alcohol 70%
7	Chloride 1000PPM
8	Incidin plus
9	Incidin liquid
10	Mikrozid liquid

Caution!

- *Do not immerse or rinse the PDC-190S or its peripherals. If you accidentally spill liquid on the device, disconnect the unit from the power source. Contact your Biomedical Department regarding the continued safety of the unit before placing it back in operation.*
- *Do not spray cleaning agents on the chassis.*
- *Do not use disinfectants that contain phenol.*
- *Do not autoclave or clean the PDC-190S or its peripherals with strong aromatic, chlorinated, ketone, ether, or Esther solvents, sharp tools or abrasives. Never immerse electrical connectors in water or other liquids.*

Appendix D

Serial Remote Control

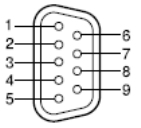
D.1 Using Serial Communications

The monitor can be operated according to control commands sent from external equipment connected to it, e.g., a personal computer. For details on the pin assignment and command protocol please refer to the section below:

Steps:

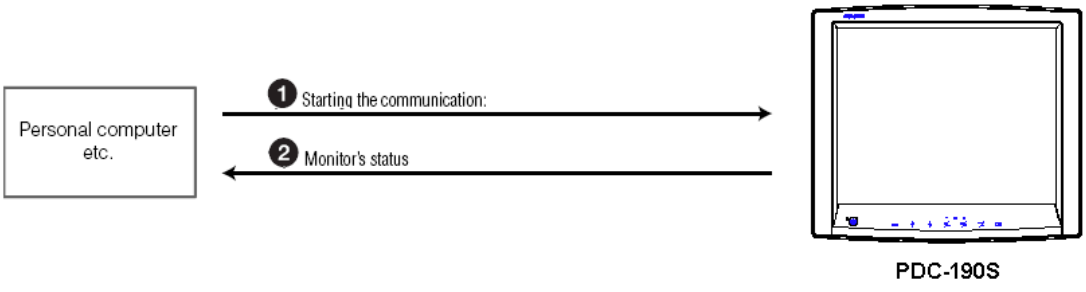
1. Prepare an RS-232C cable.
2. Connect the male end to the RS-232C terminal port on the PDC-190S.
3. Connect the female end to the RS-232C terminal port on the personal computer.

Input terminal	Cable	Communication Specifications
RS-232C	A straight cable with a D-sub 9-pin connector (male for the monitor, female for the personal computer etc.)	Baud Rate: 115200 bps (when Power On mode) Data Bits: 8 bits Parity: No parity Stop Bits: 1 bit Flow Control: No control Communication Code: Hex Code



This is a female terminal.

Pin No.	Signal
1	NC
2	RXD
3	TXD
4	NC
5	GND
6	NC
7	RTS
8	CTS
9	NC



D.2 Command Outline

To start communication, send the connection command from the personal computer etc.

For details, see table D.2 <Command list> below. The command packet consists of four bytes. They are: two bytes of fixed header, one byte of command data, and one byte of Check sum calculated in ((summation of 04h, 12h, command data) + 01h)

04h	12h	Command Data	Check Sum

Figure D.1 Communication packet format

Table D.1: Command List

Function		Command Data	Check Sum	Remark
Power control	POWER ON	96(hex)	54(hex)	Baud Rate: 4800 bps Data Bits: 8 bits Parity: No parity Stop Bits: 1 bit Flow Control: No control Communication Code: Hex Code
	POWER OFF	97(hex)	53(hex)	Baud Rate: 115200 bps Data Bits: 8 bits Parity: No parity Stop Bits: 1 bit Flow Control: No control Communication Code: Hex Code
Select Main Video Source	VGA	98(hex)	52(hex)	
	RGBS	99(hex)	51(hex)	
	DVI	9A(hex)	50(hex)	
	YCbCr	9B(hex)	4F(hex)	
	S-Video	9C(hex)	4E(hex)	
	CVBS	9D(hex)	4D(hex)	
	SDI	9E(hex)	4C(hex)	
Speaker Volume Control	Volume Up in 1 step	9F(hex)	4B(hex)	
	Volume Down in 1 step	A0(hex)	4A(hex)	
Multi display control	PIP On	A1(hex)	49(hex)	
	PIP Off	A2(hex)	48(hex)	
Simulate the OSD buttons action	Source Key	A3(hex)	47(hex)	
	Up Key	A4(hex)	46(hex)	
	Down Key	A5(hex)	45(hex)	
	Dec Key	A6(hex)	44(hex)	
	Inc Key	A7(hex)	43(hex)	
	Menu Key	A8(hex)	42(hex)	

Note! *These commands can be used while the monitor is off (standby), but please take care that the RS-232C baud rate is changed to 4800 bps.*

Appendix E

Error Messages

E.1 General

Sometimes you may see error messages from the LCD display. This means that the LCD display cannot correctly receive the signal from the computer graphics card or video equipment or is there is an under processing signal.

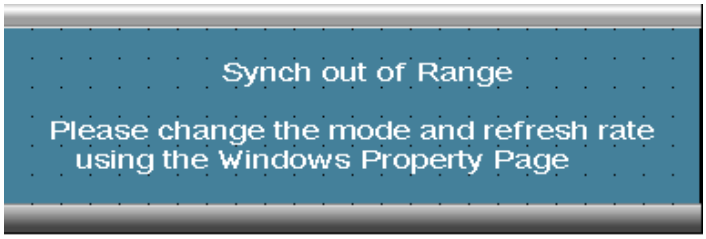
There are three kinds of messages which may appear. Check the connected cables first or contact your local dealer for more information.

E.2 No Sync (No Signal)

This message means that the LCD monitor has been powered on but it cannot receive a signal from the computer graphics card/video equipment you have connected. Check to see if you have selected the correct input source (via the source button) and then check the connection of power cables and video signal cables.

E.3 Sync out of Range (Unsupported Timing)

This message indicates the computer graphics card/video equipment is not compatible with the LCD display. When the signal does not match one of those listed in the compatibility mode we from Table B-1 of this manual, the LCD display will appear this message:



E.4 Auto Configuration*

This message means the monitor is adjusting automatically according to the input signal.

Note! *This message only appear on D-sub (VGA) input signal.*

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